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10/784,065	02/20/2004	Daniel J. Magenheimer	200315952-1	2613

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FORT COLLINS, CO 80527-2400

EXAMINER
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KAWSAR, ABDULLAH AL

ART UNIT	PAPER NUMBER
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2195

NOTIFICATION DATE	DELIVERY MODE
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01/14/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/784,065	<b>Applicant(s)</b> MAGENHEIMER, DANIEL J.	
	<b>Examiner</b> ABDULLAH AL KAWSAR	<b>Art Unit</b> 2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-27,29-31,33 and 35-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-27,29-31,33 and 35-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>02/20/2004, 12/30/2004</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

1. Claims 1, 3-27, 29-31, 33, 35-43 are pending.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 3-8, 10-27, 29-31, 33, 35, 37-43 rejected under 35 U.S.C. 102(e) as being anticipated by Bennett et al. (Bennett) US Patent Publication No. 2004/011732.

4. As per claim 1, Bennett teaches the claimed invention as claimed including a computer system comprising:

at least one processor (par. 0016, lines 3-5); and

a flexible operating system executable on the at least one processor to (par. 0015, lines 3-6; par. 0016, lines 3-5):

determine whether said flexible operating system is being used as a native operating system(VMM) or as a virtualized operating system(guest software) on said computer system (par. 0031, lines 1-4; par. 0032, lines 1-4); and

execute in a first manner as a native operating system on the computer system in response to detecting that said flexible operating system is being used as the native operating

Art Unit: 2195

system(VMM controls interrupt), and execute in a second manner as a virtualized operating system(guest software controls interrupt) on said computer system in response to detecting that said flexible operating system is being used as the virtualized operating system(par. 0031; par. 0033, lines 1-4);

wherein said flexible operating system is configured to operate in a non-virtualized environment when said native operating system is being used as the native operating system, and is configured to operate in a virtualized environment when said flexible operating system is being used as the virtualized operating system (par. 0024; par. 0026; par. 0027).

5. As per claim 3, Bennett teaches that said flexible operating system executing in said second manner comprises said operating system acting as a paravirtualized operating system (par. 0021).

6. As per claim 4, Bennett teaches that paravirtualized operating system is operable to make a call to a Virtual Machine Monitor (VMM) for performing at least one privileged operation (par 0020, lines 1-6).

7. As per claim 5, Bennett teaches that operating system determines whether said flexible operating system is being used as the native operating system or the virtualized operating system by: checking a global variable that indicates whether said flexible operating system is being used as the native operating system or as the virtualized operating system on said computer system (par. 0032, lines 1-4; par 0024; lines 1-5; lines 12-14).

8. As per claim 6, Bennett teaches execute an instruction which, when the flexible operating system is being used as the virtualized operating system, causes a Virtual Machine Monitor (VMM) to set at least one configuration bit to a first value and when the flexible operating system is being used as the native operating system, causes the VMM to set said at least one configuration bit to a different value (par. 0023, lines 1-5; par 0024; lines 1-5; lines 12-14).

9. As per claim 7, Bennett teaches set said global variable based at least in part on the value of said at least one configuration bit after executing said instruction (par. 0032, lines 1-4).

10. As per claim 8, Bennett teaches make a call to a Virtual Machine Monitor (VMM) for performing at least one privileged operation(par. 0020, lines 3-5).

11. As per claim 10, Bennett teaches making the call to said VMM is used for performing said at least one privileged operation if it is determined that said flexible operating system is being used as virtualized operating system on said computer system (par. 0031, lines 6-9; par. 0020, lines 1-6).

12. As per claim 11, Bennett teaches the invention as claimed including a method comprising:

implementing at least one operating system on a computer system(par. 0015, lines 3-6; par. 0016, lines 3-5);

Art Unit: 2195

determining, by said computer system, whether said at least one operating system is a native operating system or a guest operating system on a virtual machine(par. 0031, lines 1-4; par. 0032, lines 1-4);

said at least one operating system operating in a first manner if determined that it is a native operating system, wherein the native operating system works in a non-virtualized environment (par. 0031, lines 1-6); and

said at least one operating system operating in a second manner if determined that it is a guest operating system on a virtual machine, wherein the guest operating system operates in a virtual environment provided by the virtual machine (par. 0033, lines 1-4).

13. As per claim 12, Bennett teaches at least one operating system determining whether it is being used as said native operating system or as said guest operating system on the virtual machine (par. 0031, lines 6-9).

14. As per claim 13, it has similar limitations as of claim 5 above. Therefore it is rejected under the same rational as of claim 5 above.

15. As per claim 14, Bennett teaches the first manner comprises said native operating system managing hardware resources of the computer system (par. 0015, lines 3-6; par. 32, lines 1-4; par. 0002).

Art Unit: 2195

16. As per claim 15, Bennett teaches wherein said second manner comprises said guest operating system having access to the computer system hardware resources that are managed by the Virtual Machine Monitor (VMM) (par. 0019).

17. AS per claim 16, Bennett teaches wherein said guest operating system makes, for at least one privileged operation a call to the VMM (par 0020, lines 1-6).

18. As per claim 17, Bennett teaches the invention as claimed including a computer system:  
at least one processor (par. 0016, lines 3-5);  
a virtual machine monitor (VMM) (par. 0015, lines 3-6); and  
an operating system executable on the least one processor to(par. 0015, lines 3-6; par. 0016, lines 3-5):

determine whether said operating system is running as a virtualized operating system or native operating system (par. 0031, lines 1-4; par. 0032, lines 1-4); and

adapt operation of said operating system depending on whether it is running as the virtualized operating system or native operating system, wherein the native operating system manages hardware resources in a non-virtualized environment without the VMM, and wherein the virtualized operating system manages hardware resources using the VMM (par. 0023, lines 1-5; par 0024; lines 1-5; lines 12-14; par. 0015, lines 3-6; par. 0016, lines 3-5; par. 0019).

19. As per claim 18, it has similar limitations as of claim 5 above. Therefore it is rejected under the same rational.

20. As per claim 19, Bennett teaches operating system checks said value of said global variable before performing certain privileged operations (par. 0021).

21. As per claim 20, Bennett teaches that operating system performs the determining by determining, before execution of certain privileged instructions, whether said operating system is running as the virtualized operating system or native operating system (par. 0020).

22. As per claim 21 and 22, their combined limitations are similar to limitations of claim 10 above. Therefore they are rejected under the same rational as of claim 10 above.

23. As per claims 23, 24 and 26, they have similar limitations of claims 8, 6 and 7 above. Therefore, they are rejected under the same rational as claims 8, 6 and 7 above.

24. As per claim 25, it has similar limitations of combined limitations of claims 5 and 7 above. Therefore it is rejected under the same rational as of combined limitations of claims 5 and 7 above.

25. As per claim 27, it is a system claim of claim 17 above. Therefore, it is rejected under the same rational as claim 17 above.



Art Unit: 2195

26. As per claims 29-31 and 33, they have similar limitations as of claims 14, 3, 4 and 10 above. Therefore they are rejected under the same rational as of claims 14, 3, 4 and 10 above.

27. As per claim 35, they are method and system claims of claim 17 above. Therefore it is rejected under the same rational as claim 17 above.

28. As per claim 37, Bennett teaches that means for virtualizing resources of said system and multiplexing said resources among one or more virtualized operating systems par. 0019).

29. As per claim 38, it has similar limitations as of claims 5 above. Therefore it is rejected under the same rational as of claim 5 above.

30. As per claim 39, Bennett teaches that if determined that it is being used as a virtualized operating system, said flexible operating system acting as a virtualized operating system (par. 0032, lines 1-4; par. 0033, lines 1-4).

31. As per claim 41, Bennett teaches said first manner comprises acting as a native operating system, and wherein said second manner comprises acting as a paravirtualized operating system(par. 0033, lines 1-4; par. 0020).

32. As per claim 42, Bennett teaches the virtualized operating system manages hardware resources of the system by using the VMM, and where the native operating system manages the

Art Unit: 2195

hardware resources in non-virtualized environment without using the VMM (par. 0015, lines 3-9; par. 0016, lines 3-5; par. 0019).

33. As per claim 43, it has similar limitations as of claims 42 above. Therefore it is rejected under the same rational as of claim 42 above.

***Claim Rejections - 35 USC § 103***

34. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al.

(Bennett) US Patent Publication No. 2004/011732, in view of Waldspurger et al.(Waldspurger)

US Patent No. 6725289.

36. As per claim 9, Bennett teaches making the call to said VMM (par. 0020, 1-6; par 0027).

Bennett does not specifically disclose VMM uses an Application Program Interface (API) defined for said VMM.

However, Waldspurger teaches VMM uses an Application Program Interface (API) defined for said VMM (col 10, lines 24-45)

Art Unit: 2195

37. It would have been obvious to a person of ordinary skill in art at the time of invention was made to incorporate the teaching of Waldspurger into the method of Bennett to use application program interface to call VMM. The modification would have been obvious because one of the ordinary skills of the art would implemented any well known software communication architecture to communicate between guest and VMM which includes using Application Program Interface as a method of communication between application.

38. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al. (Bennett) US Patent Publication No. 2004/011732, in view of Fish(Fish) US Patent No. 6199159.

39. As per claim 36, Bennett does not specifically disclose determining means makes the determination during a boot-up process of the system (par. 0024, lines 1-6).

However, Fish teaches determining means makes the determination during a boot-up process of the system (col 2, lines 64-67 through col 3, lines 1-5).

40. It would have been obvious to a person of ordinary skill in art at the time of invention was made to incorporate the teaching of Fish into the method of Bennett to determining during boot-up process. The modification would have been obvious because one of the ordinary skills of the art utilize the value saved in VMCS in the processor as an identifier to determine the operating mode during boot-up process.

*Response to Arguments*

41. Applicant's arguments filed 11/05/2008 have been fully considered but they are not persuasive.
42. In the remarks applicant argues:
- (1) Bennett fails to teach a flexible operating system is configured to run in non-virtualized environment when the flexible operating system is being used as a native operating system and is configured to operate in a virtualized environment when the flexible operating system is being used as a virtualized operating system.
- (2) Bennett fails to teach paravirtualized operating system that is operable to make call to a VMM for performing at least one privileged operation.
43. Examiner respectfully disagree with applicant:
- i. As to point (1), applicant supports his argument mentioning that by definition a guest operating system runs within a virtual machine and therefore cannot constitute a native operating system that operates in a non-virtualized environment. The claim limitation is broad and do not specify how and where the identification is made and what will constitute the machine running in virtual mode or non-virtual mode. The claim limitation does not specifically disclose the execution state of the different operation or the execution layer that differentiates between the virtual and non-virtual operating mode. A virtual machine is an abstraction of software that runs within the VMM(virtual machine monitor) where the VMM is operates in native mode on the bare machine and

Art Unit: 2195

the virtual machine is the abstraction layer that runs in virtual mode on the VMM and operated through VMM. Bennett teaches having an interrupt controller that can service interrupt in virtual mode or in native mode. If an interrupt needs service in virtual mode the interrupt controller is transferred to the virtual machine(virtual mode) where the interrupts are services in virtual machine and when the interrupt needs service in VMM (native mode) the interrupt controller is transferred to the Virtual Machine Monitor(native mode) which services the interrupt in non-virtual mode. Accordingly the system can operate in virtual mode and non-virtual mode (par. 0002, 0003, 0015, 19, 23, 24, 26, 31, 32, 33)

ii As to point (2), applicant supports his argument mentioning that Bennett fails to teach a paravirtualized operating system that can make a call to a VMM for performing at least one privileged operation. Examiner respectfully disagrees with the applicant. The claim limitation does not specifically disclose what is defined by a paravirtualized operating system. According to PC magazine the definition for paravirtualization is “The modification of the source code of an operating system in order to run as a guest operating system in a specific virtual machine environment. Calls to the hardware from the guest OS are replaced with calls to the virtual machine monitor (VMM).”, which means the operating system calls the VMM for servicing the call on the VMM instead of going through the hardware emulation. Bennett teaches virtual machine having privileged and non-privileged interrupt operation where the privileged interrupts are serviced by transferring the interrupt control to the VMM where the VMM services the interrupts

Art Unit: 2195

service which defined the virtual machine operating on the VMM as a paravirtualized operating system (par. 20, 21)

***Conclusion***

44. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

45. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

46. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABDULLAH AL KAWSAR whose telephone number is (571)270-3169. The examiner can normally be reached on 7:30am to 5:00pm, EST.

47. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng Ai T. An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

48. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/VAN H NGUYEN/  
Primary Examiner, Art Unit 2194

/Abdullah-Al Kawsar/  
Examiner, Art Unit 2195